

## CLAIMS

1. A device for injecting a secondary fluid located between two successive granular beds to produce and distribute a polyphase mixture between said secondary fluid and a fluid or mixture of fluids originating from the upper granular bed, characterized in that it comprises a chamber for injecting a secondary fluid, in that said secondary fluid is injected into said device, and in that it also comprises means for bringing said secondary fluid and at least a portion of the fluid or mixture of fluids originating from the upper granular bed into contact, and for simultaneous distribution of the mixture resulting from said contact to the lower granular bed.
2. A device according to claim 1, in which said secondary fluid is a gas phase at least partially comprised by hydrogen.
3. A device according to claim 1 or claim 2, in which said contact and distribution means are conduits (204) with a substantially constant diameter along their axial length traversing said injection chamber and pierced with orifices (208) over their lateral wall.
4. A device according to any one of the preceding claims, comprising conduits (206) for the passage of a gaseous fraction of fluid or a fluid mixture originating from the upper granular bed, traversing the chamber in a fluid tight manner, the height of which is greater than the maximum height reached by the liquid, the upper portions of which are provided with a plate preventing flow of the liquid fraction of the fluid or fluid mixture originating from the upper granular bed through said conduits.
5. A device according to claim 1 or 2, in which said contact and distribution means are:
  - conduits (222) allowing passage of the secondary fluid into a zone located above said chamber;
  - tubes or mixer channels (224) with a substantially constant diameter along their axial length traversing the chamber in a fluid tight manner, the upper portions of which are

provided with orifices for passage and mixing of a secondary fluid and at least a portion of the fluid or mixture of fluids issuing from the upper granular bed.

6. A device according to any one of claims 1 to 5, characterized in that the contact and distribution means extend below the chamber by a distance  $h_t$ .

7. A device according to any one of claims 1 to 6, in which the distance between the bottom of the conduits, tubes or mixer channels and the upper surface of the bed is in the range 0 to 50 mm, 0 excluded and the density of the conduits (204), (224) is more than 80 per square metre.

8. A fixed bed reactor, characterized in that it comprises:

- at least one upper bed of granular solids;
- at least one device according to any one of claims 1 to 7 located downstream of said upper bed, to mix and distribute a secondary fluid and a fluid or a mixture of fluids issuing from said bed;
- at least one bed of granular solids located downstream of said device;
- at least one separate line for injecting secondary fluid into the chamber of said device, said injection preferably being substantially perpendicular with respect to the axis of the reactor.

9. A reactor according to claim 8, in which the liquid and gas phases circulate through the granular bed or beds in co-current dropper mode.

10. A reactor according to claim 8 or claim 9, characterized in that the bed or beds of granular solids comprise at least one catalytic granular solid.

11. Use of a device and/or reactor as defined in any one of the preceding claims, in hydrodesulphurisation, selective hydrogenation or hydrodenitrogenation processes.